

**UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
RENTON, WASHINGTON 98055-4056**

In the matter of the petition of

Israel Aircraft Industries, Ltd.

for an exemption from §§ 25.783(h),
25.807(g)(1), 25.810(a)(1), 25.813(b)(3)
25.857(e) and 25.1447(c)(1) of Title 14,
Code of Federal Regulations

**Regulatory Docket No.
FAA-2003-16618**

GRANT OF EXEMPTION

By letter dated December 2, 2003, Mr. J.E. Murdock III, Shaw Pittman LLP, 2300 N Street, N.W., Washington, D.C. 20037, petitioned on behalf of Israel Aircraft Industries Ltd for an exemption from §§ 25.783(h), 25.807(g)(1), 25.810(a)(1), 25.813(b)(3), 25.857(e) and 25.1447(c)(1). This exemption would allow carriage of two non-crewmembers (commonly referred to as supernumeraries) on Boeing Model 737 airplanes, which have been modified to passenger/freight convertible airplanes. The petition is applicable to the freighter configuration of these airplanes.

The petitioner requests relief from the following regulations:

Section 25.783(h), at Amendment 25-88, requires each passenger entry door in the side of the fuselage to meet the applicable requirements of §§ 25.807 through 25.813 for a Type II or larger passenger emergency exit.

Section 25.807(g)(1), Amendment 25-94, requires that, if overwing exits are not provided, airplanes having a passenger seating configuration of 1 to 9 seats must be fitted with an emergency exit having at least the dimensions of a Type III exit in each side of the fuselage.

Section 25.810(a)(1), Amendment 25-88, requires that each non-overwing emergency exit more than 6 feet from the ground have an approved means to assist occupants in descending to the ground. For passenger exits, this must be a self-supporting, automatically deployed and erected slide at each applicable exit.

Section 25.813(b), Amendment 25-88, requires that each emergency exit addressed by § 25.810(a) have adjacent assist space.

Section 25.857(e), at Amendment 25-93 requires, in pertinent part, that when a Class E cargo compartment is installed on the airplane, the airplane is used for carriage of cargo only.

Section 25.1447(c)(1), at Amendment 25-87, requires, in pertinent part, that oxygen dispensing units must be automatically presented to the occupants before the cabin altitude exceeds 15,000 feet. The total number of dispensing units and outlets must exceed the number of seats by at least 10 percent. The extra units must be uniformly distributed throughout the cabin as practicable. There must be at least two oxygen dispensing units connected to oxygen terminals in each lavatory.

Related sections of the regulations:

Section 25.807(i)(1), Amendment 25-94, requires that airplanes having a passenger seating configuration of 1 to 9 seats must have at least one exit above the waterline in each side of the airplane, meeting at least the dimensions of a Type IV exit.

Section 121.583(a) contains, in pertinent part, a listing of categories of persons who may be carried aboard an airplane in part 121 service without complying with all the requirements of part 121 pertaining to carriage of passengers.

The petitioner supports its request with the following information:

“1) Introduction

“IAI has requested to certify (STC) a major modification of a B737-300 aircraft from passenger to a dual purpose Quick Change airplane capable of carrying alternately cargo or passengers. The program is being certified by the CAAI and then by the FAA via a validation process. The program has been identified by the CAAI as Project 305 and the certification basis has been defined by the appropriate G1 paper. IAI is requesting to be granted in the STC an exemption from meeting certain requirements, as described below. The exemptions requested are all related to the carriage of two non crew members (Supernumeraries) on the flight deck and to emergency exit design related to same; when using the airplane in the Cargo mode. No exemption is

requested for the passenger carrying mode of operation. The exemption is requested for all B737 aircraft modified to Quick Change under the IAI STC.

“a. FAR 25 Affected Sections

“FAR 25.783 Amdt 88 *Doors* (h) requires that each passenger entry door shall meet the requirements of 25.807 through 813 (be an emergency exit).

“FAR 25.807 Amdt 94 *Emergency Exits* g(1) requires that for aircraft with 1 to 9 passengers without over-wing exits, at least one type III emergency exit (‘rectangular opening of not less than 20 inches wide and 36” high with corner radii not greater than 7”) shall be provide[d] on each side of the aircraft.

“FAR 25.810 Amdt 88 *Emergency Egress Assists Means* (a)(1) requires a slide for passenger exits.

“FAR 25.813 Amdt 88 *Emergency Exit Access* (b)(3) requires adequate space at one side of any other emergency exit to assist passengers in descending from the exit.

“FAR 25.857 Amdt 93 *Cargo Compartment Classification* (e) requires that when a class E Cargo Compartment is installed on an airplane the airplane is used for transport of cargo only.

“FAR 25.1447(c)(1) Amdt 87 *Equipment Standards for Oxygen Dispensing Units* requires automatic presentation of oxygen dispensing units to the passengers in case of cabin pressure altitude above 15000 ft.

“2) IAI Conversion Configuration

“a) Flight Deck Occupancy and seating arrangement

The original flight deck of the B737 has been designed and certified for an occupancy of four people – two crew members and two non crew members. The modified airplane maintains the same seating configuration and arrangement on the flight deck as the original TC certified arrangement.

“b) Emergency Exits Arrangement and Accessibility (See Fig 1)

“The B737-300 in the passenger configuration is originally fitted and certified with emergency exits for the flight crew: The window #2R, that is openable from inside and from outside and window #2L which is openable from the inside only. The window opening measures 21” wide at the lower edge, 22” high at the aft edge, 16” wide at the

upper edge and 17” high at the forward edge. In the IAI conversion program from Passenger configuration to Full Cargo configuration the flight compartment left hand side window #2L mechanism is modified to provide the capability to be openable also from outside. Window opening and mechanism are identical to the window 2R. (Ref IAI drawing 365-56-00-93641).

“The flight compartment is originally fitted with two egress ropes attached to the flight compartment ceiling.

“The service door on the right hand side of the cabin (1R) is retained as is as an emergency exit including the existing slide and emergency signs. Door size is 30”x65”(Type C). Door is openable from inside and outside.

“The left hand forward entry door (1L) is retained as is as an emergency exit when carrying passengers. When the airplane is used in Cargo mode, Door 1L is used for normal entry only and is not used as an emergency exit since at 9g emergency conditions the access to this door will be blocked by the 9g net.

“The 9g net is located at the free position at aircraft station 352 approximately. In the 9g crash condition the net distention is not more than 41.1 inches, as substantiated by net certification data. Figure 1 shows the location of the 9G net at the free position and the position of the net after distention at 9G forward crash condition. At crash condition the net will not impact the lavatory, a minimum of 3” gap is maintained and a clear emergency path of minimum 21” is available to the right hand service door (DOOR 1R). This exceeds the minimum 20 inch required. In the crash condition with the net at the maximum distension the crew/supernumerary will be able to open the door that opens first inward and forward and then swings outboard. Also opening the door from outside is possible. In the 9G forward crash condition all the loads are transferred aft into the net attachments that are attached to the aircraft skin, distributed all around the fuselage (16 points) and into the floor structure (8 points), and is transferred aft to the aircraft skin and stringers. The structure around the door will not sustain any damage or deformation that could jam the door. In Passenger mode the net is removed.

“c) Oxygen provisions

“The supernumeraries seated in the flight deck use in case of loss of pressure the original existing flight deck certified oxygen supply and masks. The masks are quick donning type and are stored within easy reach of the seated passengers. They are not presented automatically

but are to be used upon instruction of the flight deck crew. An extra ten percent masks is not provided.

“3) Requested exemption

“An exemption is requested from meeting FAR 25.783(h) when using the airplane in Cargo mode, by not using the passenger entry door as an emergency exit. The door will be used only for normal entry. In Passenger mode the doors are in compliance with the regulation.

“An exemption is requested from meeting FAR 25.807(g)(1) when using the airplane in Cargo mode, by not providing the non-crew members on the flight deck an emergency exit door Type IV or Type III on each side of the fuselage, and providing instead an emergency exit through door 1R (Type C) on one side and additional exit through the flight deck existing emergency exit windows 2L and 2R.

“An exemption is requested from meeting FAR 25.810(a)(1) when using the airplane in Cargo mode, by allowing the usage of rope instead of a slide when exiting through the windows. The existing slide remains in use on door 1R. In passenger mode door 1L slide is also used in full compliance.

“An exemption is requested from meeting FAR 25.813(b)(3) in cargo mode by not having space for assistance near the flight deck windows exits.

“An exemption is requested from meeting FAR 25.857(e) to permit the flight of two non-crew passengers on a cargo aircraft with a class E cargo compartment.

“An exemption is requested from meeting FAR 25.1447(c)(1) by not having automatic presentation of the oxygen masks to the supernumeraries.

“4) Supporting Arguments

- “a) In order to optimize the usage of the B737-300 as a cargo airplane, operators need to be able to accompany their cargo by people whose function is to take care of sensitive cargo and of loading and unloading tasks at any port of arrival. Their presence on the aircraft ensures they will be immediately available on arrival to take care of the cargo. This is very important for example in case of transport of perishable goods, items of value etc. It will also shorten the turnaround time at the airport gates and relieve some of the airport congestion.
- “b) Some of the cargo items being transported may include hazardous materials, whereas the presence of personnel trained and qualified in their handling will enhance safety.
- “c) Some of the locations serviced by the cargo carriers may not have ground maintenance centers capable of performing necessary tasks for the operator aircraft nor passenger flights to carry maintenance

personnel to the location. The ability to transport the company maintenance personnel on the company flights increases the flexibility of operation.

- “d) The B737-300 is a relatively small airplane. A design that would comply with all the mentioned regulations (for example by placing the 9g net further aft to keep door 1L as active emergency exit), would cause a significant loss of cargo volume and have severe impact on the economy of operating the airplane for cargo transport. In addition it would necessitate more airplanes for the same cargo volume, increasing airports congestion.
- “e) The requested exemptions do not reduce cabin safety, as discussed in para 5.

“5) Cabin Safety Discussion

“The original flight deck of the B737 has been designed and certified for an occupancy of four people – two crew members and two non crew members. With the airplane converted to Quick Change the same seating configuration remains on the flight deck, but since door 1L is blocked by the net it is not possible to keep it as an emergency exit when using the airplane in Cargo mode.

“In the original TC passenger configuration the two non crew members can use door 1R or door 1L for emergency egress, but they have to use them together with some additional twenty to fifty passengers coming in the opposite direction from the cabin.

“In the freighter configuration they have door 1R for themselves, or they can use the flight deck two windows with the two crew members.

“It is considered that the emergency exits provided for the flight deck occupants provide a level of safety that is equivalent to the requirements.

“The non crew members will be limited to people in the categories of section 121.583(a)(1) thru (7). The non-crewmembers shall be trained in the necessary emergency egress procedures. These people shall be physically capable of using the rope [descent] means and will not need assistance by a crewmember. In addition the non crewmembers shall be briefed preflight about the emergency procedures by the crew. The necessary instructions shall be incorporated in the flight manual.

“The location of the supernumeraries on the flight deck ensures they become immediately aware of any need to don the oxygen masks, as they would see the crew donning their masks and would be alerted in person by the crew. An appropriate level of safety is also ensured by the training provided to the supernumeraries.

“6) Public Interest

“The granting of the requested exemption will be in the public interest, as by allowing the carriage of the supernumerary persons aboard the cargo flights the operators will be able to optimize the safety conditions of the cargo operation, to make the operation more efficient and to improve the utility of the airplanes and the airports.”

Notice and Public Procedure

A summary of this petition was published in the Federal Register on December 24, 2003 (68 FR 74696) for public comment. No comments were received.

The FAA's analysis/summary is as follows:

The petitioner has requested relief primarily from the requirements of § 25.857(e), which permits carriage of cargo only when a Class E cargo compartment is installed on the airplane. Class E cargo compartments are usually remote from the flightdeck and encompass the entire interior of the airplane. The means of controlling fires that might occur in the cargo compartment is to starve the fire of oxygen. This is accomplished by depressurizing the airplane and maintaining an altitude that will not support combustion. For this reason, passengers are not permitted on board such airplanes. The two supernumeraries will be located in the flightdeck. The FAA has previously granted exemptions for carriage of persons in addition to crew on freighter airplanes, provided that certain other conditions are met. These conditions have varied, depending on the airplane design and the number of persons involved.

In all cases, there must be suitable means of preventing smoke penetration into areas that are occupied. The petitioner's design accounts for this by providing a barrier, consisting of the flightdeck bulkhead, which must comply with the smoke penetration requirements for the flightdeck.

Due to the way that fire in the cargo compartment is to be controlled, it is necessary to limit persons on board the airplane to those who have been found physically fit by the operator and have been briefed on the use of emergency equipment. This limitation on the occupants is consistent with previous approvals and will be included in this approval.

The certification regulations for transport category airplanes address airplane occupants as being either “crew” or “passengers.” Due to differences in training, physical capabilities, and other factors (such as familiarity with the airplane), the means required by part 25 to address emergency evacuation and emergency equipment differ for passengers and crewmembers. Because supernumeraries are not crewmembers, they must be considered “passengers” by default, with respect to part 25.

The petitioner has requested an exemption from § 25.783(h), which requires the passenger entry door to qualify as an emergency exit. The petitioner has indicated that access to the passenger entry door would be blocked by cargo restrained by a net during an emergency landing. The FAA finds it acceptable for the passenger entry door to not qualify as an emergency exit per § 25.783(h) since other emergency exits will be provided and each supernumerary will receive evacuation training on the use of these emergency exits.

Section 25.807(g)(1) requires an exit, which meets the minimum size of a Type III exit, on each side of the airplane. The petitioner's design includes three emergency exits: a right side flightdeck window exit, a left side flightdeck window exit, and the right side door 1 exit. The right side door 1 exit meets the minimum size requirements of a Type III exit, but is only considered acceptable as an emergency exit for the supernumeraries if the flightdeck door is latched open during taxi, takeoff, and landing to allow clear access from the flightdeck to the exit. However, the FAA considers that an acceptable level of safety will be provided for two supernumeraries by the flightdeck window exits. This determination is based on the number of supernumeraries on the flightdeck being limited to two and requirements that the supernumeraries have a higher level of training and be physically more capable of evacuating the airplane through these smaller exit openings than typical passengers.

Although not mentioned by the petitioner, § 25.807(i)(1) requires that airplanes having a passenger seating configuration of 1 to 9 seats must have at least one exit above the waterline in each side of the airplane, meeting at least the dimensions of a Type IV exit. The flightdeck window exits are above the waterline but do not meet the minimum size requirements of a Type IV exit. However, the FAA will require an Airplane Flight Manual (AFM) limitation that requires the operator to determine that each supernumerary is physically able to use the evacuation routes. If life-rafts must be installed for flights over water, then they must be of a design that can be launched out the flightdeck windows.

As stated above, because of their training and physical capabilities as well as other factors, flight crewmembers are different from those of typical passengers, and, as such, the means required by part 25 to enable flight crewmembers to reach the ground are different from those required for passengers. Ropes are allowed as the sole means of escape for flight crewmembers, but slides or equivalent means are required for passengers. The FAA has considered the acceptability of ropes as the evacuation means at the flightdeck window exits for the two supernumeraries. The FAA considers that ropes will provide an acceptable level of safety for two supernumeraries in view of the distance from the window exits to the ground, the training that the supernumeraries will receive, and a limitation that the operator must determine that each supernumerary is physically capable of using the ropes.

With respect to § 25.813(b), the FAA has determined that the two supernumeraries will be trained on use of the exit routes, and the lack of assist

space adjacent to the exits is acceptable. Additionally, in the relatively small confines of the flightdeck, the flightcrew can easily provide instructions and some physical assistance to supernumeraries, if needed.

The FAA finds that supernumeraries should have a supplemental oxygen system that is comparable to that of passengers. However, taking into account the extra knowledge and training that supernumeraries will have, the FAA does not find that an equivalent system needs to be provided. The petitioner has proposed that the currently certified oxygen system be used to provide oxygen for the two supernumeraries. Section 25.1447(c)(1) requires automatic presentation of the oxygen dispensing units. The two supernumeraries will be seated close to the flightcrew, and the donning of oxygen masks by the flightcrew would be an indication for the supernumeraries to don their own oxygen masks. Additionally, the supernumeraries must be trained about the location and use of the oxygen equipment in order to provide them an appropriate level of safety. The FAA considers this to be sufficient. Note that oxygen units must be sized adequately for continuous and uninterrupted use during worst-case flight duration following a decompression.

Section 25.1447(c)(1) requires that there be ten percent more oxygen masks than occupants. The FAA considers that the rationale behind this requirement does not apply in this case.

The scope of this evaluation does not include consideration of supernumeraries entering the cargo compartment aft of the 9g net during flight. Such access would require additional limitations to provide an appropriate level of safety to the supernumeraries. An AFM limitation must be established that prohibits supernumeraries from being in the Class E compartment aft of the net during flight.

In consideration of the foregoing, I find that a grant of exemption is in the public interest and will not affect the level of safety provided by the regulations. Therefore, pursuant to the authority contained in 49 U.S.C. 40113 and 44701, delegated to me by the Administrator, Israel Aircraft Industries, Ltd., is hereby granted an exemption from §§ 25.783(h), 25.807(g)(1), 25.807(i)(1), 25.810(a)(1), 25.813(b)(3), 25.857(e) and 25.1447(c)(1). The petition is granted to the extent required to permit type certification of Boeing Model 737-300 airplanes that have been modified to passenger/freighter convertible airplanes (referred to as 737 Quick Change airplanes by the petitioner). This exemption is applicable to the freighter configuration of these airplanes. The following limitations apply and must be documented in the limitations section of the Airplane Flight Manual:

1. A maximum of two supernumeraries may occupy the flightdeck.
2. Supernumeraries are limited to the categories specified in § 121.583(a)(1) through (a)(7).

3. Each supernumerary must be briefed by a flight crewmember on the use of the exits and emergency equipment prior to each flight.
4. The operator must determine that each supernumerary is physically able to accomplish the necessary emergency procedures.
5. Supernumeraries are prohibited from being in the cargo area aft of the net during flight. The preflight briefing must inform supernumeraries of this requirement.

Issued in Renton, Washington, on February 18, 2004.

/s/ Kalene C. Yanamura
Acting Manager
Transport Airplane Directorate
Aircraft Certification Service